



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,515	03/29/2002	Hiroki Kabumoto	020313	4583
23850	7590	06/27/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			TSANG FOSTER, SUSY N	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,515

Applicant(s)

KABUMOTO ET AL.

Examiner

Susy N. Tsang-Foster

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005 and 30 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-19 is/are pending in the application.
- 4a) Of the above claim(s) 13-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-11 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 4/8/2005 and applicant's remarks filed on 12/30/2004. Claims 1, 3, 4, 7, and 11 have been amended. Claim 2 has been cancelled. Claims 1, and 3-19 are pending. Claims 13-19 are withdrawn from further consideration as being drawn to a non-elected invention. Claim 12 is objected to. Claims 1, and 3-11 are finally rejected for reasons of record and for reasons necessitated by applicant's amendment.

Drawings

2. The drawings were received on 4/8/2005. These drawings are approved by the Examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 7-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Art Unit: 1745

In claim 7, the limitation “the gas diffusion layer includes a water retentivity adjustment layer that is formed by applying a mixture containing carbon particles” is not in the original disclosure. The original disclosure shows that a water retentivity layer is applied onto the gas diffusion layer in Figure 5 and is not part of the gas diffusion layer. In contrast, in Figure 3, the gas diffusion layer is constructed in such a manner such that water retentivity is higher in parts facing the oxidant channels than in parts facing the ribs.

Paragraph 22 of the specification (see USPGPUB 2002/0192530 which corresponds to the instant application) states “[a]lternatively, the above water retentivity adjustment can be accomplished by applying a mixture of carbon particles and a water repellant material on the gas diffusion layer so as to form a water retentivity adjustment layer, and by adjusting water retentivity of the water retentivity adjustment layer.” This water retentivity layer is different from the gas diffusion layer. Figures 3, 5, 8, and 10 all show different embodiments of applicant’s invention.

Paragraph 116 of the specification discusses the second embodiment of applicant’s instant invention in which a mixture of carbon particles and a water repellent material is applied on the surface of the cathode side gas diffusion layer to form a water retentivity adjustment layer. In Figure 5, reference label 125 is the water retentivity adjustment layer and reference label 124 is the gas diffusion layer. Also paragraph 226 of the specification states that the water retentivity adjustment layer 125 is provided only on the surface of the cathode side gas diffusion layer 124 facing the cathode catalyst layer 22.

In claim 11, the limitation “carbon particles that are used in the parts facing the ribs have a larger specific surface area than carbon particles that are used in the parts facing the oxidant

Art Unit: 1745

channels” is not in the original disclosure. Instead, the specification states the water retentivity adjustment in the water retentivity layer can be accomplished by using carbon particles with higher water retentivity (with a larger specific surface) in the parts facing the oxidant channels than carbon particles used in the parts facing the ribs (see paragraph 23 of instant specification).

Claims depending from claims rejected under 35 USC 112, first paragraph are also rejected for the same.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 5-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how claims 5 and 7 can alternatively depend on cancelled claim 2.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3, and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Taniguchi et al. (US Patent No. 6,083,638).

Taniguchi et al. disclose a fuel cell comprising a unit cell that is formed by arranging a cathode catalyst layer on one surface of a proton exchange membrane and an anode catalyst layer on another surface of the proton exchange membrane; a first plate on which fuel channels for supplying a fuel are formed; and a second plate on which (a) oxidant channels for supplying an oxidant and (b) ribs are formed, the second plate and the first plate sandwiching the cell unit in such a manner that the oxidant channels and the ribs face the cathode catalyst layer and the fuel channels face the anode catalyst layer, wherein a gas diffusion layer (current collector 41) is interposed between the cathode catalyst layer and the second plate, and the gas diffusion layer is formed in such a manner that water retentivity is higher in parts facing the oxidant channels than in parts facing the ribs (see Figures 1, 6(a), and 6(b); col. 3, lines 20-65; col. 4, line 65 to col. 7, line 34; col. 12, line 42 to col. 13, line 32).

Specifically, as seen in Figure 6(b), strips of hydrophilic material that are impregnated into the gas diffusion layer that face the oxidant channels extend from the inlet to the outlet end of the gas diffusion layer such that the hydrophilic material is also present in the vicinity of an inlet for the oxidant at one end of the gas diffusion layer. As understood by one of ordinary skill in the art, the oxidant flows from one end of the gas channels to the other end of the gas channels and one end of the gas channels is in the vicinity of the oxidant inlet and the other end of the gas channels is in the vicinity of the oxidant outlet.

The hydrophilic material is not present in the gas diffusion layer facing the ribs. The reference specifically states that the hydrophilic layers 203 are parallel to each other and are positioned almost along the centers of the gas channels and are properly dispersed into the entire porous substrate of the gas diffusion layer (col. 12, lines 49-62). The remaining areas of the gas

Art Unit: 1745

diffusion layer not impregnated with the hydrophilic layers including the portions facing the ribs would have less water retentivity than the areas facing the gas channels. The entire region of the gas diffusion layer having this differential water retentivity includes 10 to 90% of the gas diffusion layer as seen in Figure 6(b).

Allowable Subject Matter

9. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 5 and 6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

The closest prior art of record, Taniguchi et al. (US Patent No. 6,083,638) do not disclose, teach, or suggest either of the following two distinguishing features: 1) the cathode catalyst layer is made of a mixture of (a) carbon particles that support a catalyst and (b) an ion exchanger, and an amount of ion exchanger in the cathode catalyst layer is larger in the parts facing the oxidant channels than in the parts facing the ribs, or 2) the gas diffusion layer is made of a conductive base material that contains a water repellent material and an amount of the water repellent material in the gas diffusion layer is smaller in the parts facing the oxidant channel than in the parts facing the ribs.

Art Unit: 1745

The Examiner is interpreting the amount to be the total amount of water repellent material per unit area of the gas diffusion facing the rib or the gas flow channel (see paragraph 64 of instant specification).

Response to Arguments

12. Applicant's arguments filed 12/30/2004 have been fully considered but they are not persuasive.

Applicant asserts that the Taniguchi et al. reference fails to teach a feature of the fuel cell as set forth in the amended claims which includes the feature that, in a vicinity of an inlet for the oxidant, water retentivity is higher in parts facing the oxidant channels than in parts facing the ribs. In response, the Examiner disagrees with applicant's assertions since Taniguchi et al. clearly discloses that the water retentivity is higher in regions facing the gas channels than regions facing the ribs for the entire region of the gas diffusion layer, including the vicinity of the gas oxidant inlet as discussed above. As understood by one of ordinary skill in the art, the oxidant flows from one end of the gas channels to the other end of the gas channels and one end of the gas channels is in the vicinity of the oxidant inlet and the other end of the gas channels is in the vicinity of the oxidant outlet.

The Taniguchi et al. reference specifically states that the hydrophilic layers 203 are parallel to each other and are positioned almost along the centers of the gas channels and are properly dispersed into the entire porous substrate of the gas diffusion layer (col. 12, lines 49-62). The remaining areas of the gas diffusion layer not impregnated with the hydrophilic layers

Art Unit: 1745

including the portions facing the ribs would have less water retentivity than the areas facing the gas channels.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

Art Unit: 1745

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/



SUSY TSANG-FOSTER
PRIMARY EXAMINER